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Original article

Locomotive syndrome in the elderly: translation, cultural adaptation, and Brazilian validation of the tool 25-*question Geriatric Locomotive Function Scale*

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ABSTRACT

Objective: The term Locomotive Syndrome refers to conditions in which the elderly are at high risk of inability to ambulate due to problems in locomotor system. For Locomotive Syndrome screening, the 25-Question Geriatric Locomotive Function Scale was created. The objective here was to translate, adapt culturally to Brazil, and study the psychometric properties of 25-Question Geriatric Locomotive Function Scale.

Method: The translation and cultural adaptation of 25-Question Geriatric Locomotive Function Scale were carried out, thus resulting in GLFS 25-P, whose psychometric properties were analyzed in a sample of 100 elderly subjects. Sociodemographic data on pain, falls, self-perceived health and basic and instrumental functionalities were determined. GLFS 25-P was applied three times: in one same day by two interviewers, and after 15 days, again by the first interviewer.

Result: GLFS 25-P showed a high internal consistency value according to Cronbach's alpha coefficient (0.942), and excellent reproducibility, according to intraclass correlation, with interobserver and intraobserver values of 97.6% and 98.4%, respectively ($p < 0.01$). Agreements for each item of the instrument were considerable (between 0.248 and 0.673), according to Kappa statistic. In its validation, according to the Pearson's coefficient, regular and good correlations were obtained for the basic (BADL) and instrumental (IADL) activities of daily living, respectively ($p < 0.01$). Statistically significant associations with chronic pain ($p < 0.001$), falls ($p = 0.02$) and self-perceived health ($p < 0.001$) were found. A multivariate analysis showed a significantly higher risk of Locomotive Syndrome in the presence of chronic pain (OR 15.92, 95% CI 3.08–82.27) and with a worse self-perceived health (OR 0.23, 95% CI 0.07–0.79).

Conclusion: GLFS 25-P proved to be a reliable and valid tool in Locomotive Syndrome screening for the elderly population.

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Síndrome locomotora em idosos: tradução, adaptação cultural e validação brasileira do instrumento 25-*Question Geriatric Locomotive Function Scale*

Palavras-chave:
Idoso
Síndrome locomotora
GLFS-25
Instrumento de avaliação

RESUMO

Objetivo: O termo síndrome locomotora (SL) designa condições nas quais os idosos apresentam alto risco de incapacidade para deambulação em decorrência de problemas em órgãos locomotores. Para seu rastreio foi criado o 25-*Question Geriatric Locomotive Function Scale* (GLFS-25). Objetivou-se aqui, traduzir, adaptar transculturalmente para o Brasil e estudar as propriedades psicométricas do GLFS-25.

Método: Feitas tradução e adaptação transcultural do GLFS-25 que originaram o GLFS 25-P, cujas propriedades psicométricas foram analisadas numa amostra de 100 idosos. Apurados dados sociodemográficos relativos a dor, queda, autopercepção da saúde e funcionalidades básica e instrumental. O GLFS 25-P foi aplicado em três momentos: num mesmo dia por dois entrevistadores e após 15 dias novamente pelo primeiro entrevistador.

Resultado: O GLFS 25-P apresentou alto valor de consistência interna, segundo o coeficiente Alfa de Cronbach (0,942); e reprodutibilidade ótima, segundo a correlação intraclasses: valores de 97,6% e 98,4%, interobservador e intraobservador, respectivamente ($p < 0,01$). As concordâncias para cada item do instrumento foram consideráveis (entre 0,248 e 0,673), segundo a estatística Kappa. Na validação, segundo o coeficiente de Pearson, foram obtidas correlações regular e boa para as atividades de vida diária básicas (AVDB) e instrumentais (AIVD), respectivamente ($p < 0,01$). Encontradas associações estatisticamente significantes com dor crônica ($p < 0,001$), queda ($p = 0,02$) e autopercepção de saúde ($p < 0,001$). A análise multivariada evidenciou risco de SL significativamente maior na presença de dor crônica (OR 15,92, IC 95% 3,08–82,27) e pior autopercepção de saúde (OR 0,23, IC 95% 0,07–0,79).

Conclusão: O GLFS 25-P demonstrou ser confiável e válido no rastreio da SL em idosos.

Introduction

The age structure of the Brazilian population has undergone major changes over the past 50 years. Life expectancy rose from 48 years in 1960 to 73.4 years in 2010. In the same period, the number of elderly individuals increased from 3.3 million (4.7% of the population) to 20.5 million (10.8% of the population). It is expected that in 2060 this value will reach approximately 73 million of elderly subjects, accounting for 33.7% of the population.[1]

This demographic transition has an important impact on public health.[2] It is estimated that the number of older people with functional dependency increases exponentially with the aging of the population, which would result in a significant financial burden to society.[3] Locomotor system diseases are the main causes of disability associated with aging, and one of the main targets for their prevention.[3,4] Data show that 21.5% of these patients have some disease of the musculoskeletal system such as osteoporosis (and related fractures), spondyloarthrosis, and osteoarthritis.[5]

For the prevention of locomotive dysfunction, the Japanese Orthopedic Association (JOA) proposed in 2007 the concept of "Locomotive Syndrome" (LS) to describe the conditions under which the elderly become dependent on care, or are at high risk of becoming dependent in the future, due to problems in the locomotor system.[6] Seven warning signs that indicate a high risk for LS have been described: not being able to put on a pair of socks while standing on one leg; often stumbles or slips inside the house; need to use a handrail when going up stairs; have difficulty in performing household activities of moderate intensity; find it difficult to walk home carrying a shopping bag weighing about 2 kg; not being able to walk continuously for 15 min; and not being able to cross the street before the traffic light changes.[7]

Several campaigns have been conducted in Japan to disseminate LS among the population. In a recent Internet based survey, JOA reported that only 26.6% of the Japanese population knew about LS. Even among patients in outpatient centers, the identification of LS was also low (24.6%).[7]

The specific characteristics of this syndrome are not fully known; however, it is believed that LS is secondary to the major musculoskeletal diseases.[6] Some of the signs and symptoms that would allow an early identification are: pain, limitation of joint mobility, and a slower deambulation.[5]

For the screening for LS, Japanese researchers also developed an evaluation tool: the "25-question Geriatric Locomotive Function Scale" (GLFS-25). This tool consists of a self-administered questionnaire with 25 items that are easily understood by the elderly, and each item is graded from 0 to 4 points. The final score is the result of the sum of all items, ranging from 0 to 100; the higher the score, the higher the physical impairment of the elderly, and 16 is the cutoff point for the diagnosis of LS.[3]

GLFS-25 covers different aspects of the last month of the patient, with 4 questions about pain, 16 questions about activities of daily living, 3 questions about social performance and 2 questions about his/her mental health status.[3]

The establishment of this new syndromic concept comes in response to the population aging process, by which the

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world is going through in the last 50 years. It is, therefore, a concept that does not refer to traditional diseases, but rather is a broad epidemiological concept related to the health system management.[3] Given this time of transition, the concern of health organizations revolves around how to increase life expectancy with health and functional independence.[8] Accordingly, the screening of this syndrome becomes crucial in order to allow the implementation of an early intervention.[3]

This study aimed at the translation, cultural adaptation to Brazil, and study of the psychometric properties of GLFS-25 in the elderly in our environment.

Materials and methods

This is an epidemiologic, observational, descriptive and analytical study approved by the Research Ethics Committee of the Universidade Federal de São Paulo/UNIFESP (CEP No. 921,390/2014).

For the translation and cultural adaptation of GLFS-25, the methodology of Guillemin et al.[9] was used. Initially, the items of the instrument in the English language have been translated into Portuguese by two independent, qualified Brazilian translators who were aware of the translation goals. The translations obtained were compared to each other, resulting in a version which was again translated into English and compared to the original version, a step carried out by two others native English translators with knowledge of the Portuguese language, and blinded for the proposed objectives.

In terms of cross-cultural adaptation, some equivalences were obtained: (1) semantic equivalence, based on the assessment of grammatical equivalence and of vocabulary, as many words of a given language may not have equivalent in other languages; (2) idiomatic equivalence, based on an extensive research in dictionaries, for the translation of certain idioms is difficult, and the meaning of certain words is not fixed nor stable; (3) cross-cultural or experimental equivalence, for the cross-cultural context of certain expressions should present "content validity" also in Portuguese and for the population of Brazil, and considering that the version of the original instrument would now be used in a country different from that for which it was created; (4) conceptual equivalence, as many items may be semantically equivalent, but without "equivalence of concept". In this last stage, a committee composed of experts from different fields (Geriatrics, Orthopedics, Rheumatology, Psychology, and Physiotherapy) and with experience with the elderly, was formed. In the end, the final version of the instrument GLFS 25-P was obtained (Table 1).

For the analysis of the psychometric properties of the newly originated Brazilian version, elderly subjects aged 60 or over, of both genders, and seen on an outpatient basis in the Division of Geriatrics and Gerontology, Universidade Federal de São Paulo – DIGG/UNIFESP, were randomly selected. Those subjects with cognitive and behavioral impairment, severe acute or chronic decompensated disease, limiting sensory deficits, and history of fractures in the lower limbs and/or spine in the last 6 months were excluded. All participants signed an informed consent.

For the whole group of participants, demographic data (age, gender, marital status, ethnic group, and education), and functional status for basic (BADL) and instrumental (IADL) activities of daily living, according to Katz and Lawton indices, respectively, were obtained. Data on the frequency of falls in the last year, self-perceived health (poor, fair, good or excellent), and presence of chronic pain (lasting 6 months or more) were collected; for this latter variable, its intensity was recorded, according to a verbal descriptive scale (mild, moderate, severe or very severe).

GLFS 25-P was administered by two independent interviewers (E1 and E2), in one same day; and after a period of 15 days (during which there was absolutely no intervention) the third application was conducted by the first interviewer (now called E3). In the study of the psychometric properties of GLFS 25-P, first of all, its reliability was analyzed, according to its internal consistency and reproducibility; and later its validation was carried out, taking into account its construct. Construct validity – a stage critically important in the validation process – involves comparing the instrument to be studied with an established "gold standard", and when this standard is not available, one makes a comparison against commonly used clinical parameters.[10] In this study, the construct validity was obtained by the correlation between GLFS 25-P and functional indices, according to BADL and IADL.

Regarding the statistical analysis, the Two-Proportion Equality Test was used in the distribution of the relative frequency of qualitative variables, and Cronbach's alpha coefficient was applied to obtain the internal consistency. In addition, the Paired Student's *t*-Test and the Intraclass Correlation Index (ICI) for intra- and inter-observer reproducibility, the Kappa coefficient for reproducibility of each question of the instrument, and the Pearson's correlation for the validation were also employed. The association between LS and chronic pain, the frequency of falls in the last year, and with different levels of self-perceived health was also evaluated with the use of the chi-squared test and by a logistic regression analysis. The level of significance was set at 0.05 (5%).

Results

In this study, the sample was composed of 100 elderly subjects with a mean age of 82 ± 1.5 (61–100) years, with a predominance of females (73%), Caucasians (50%), state of widowhood (52%), and low level of education (mean of 5.1 years, 57% had only 1–4 years) (Table 2).

As for the functionality of the participants, there was a predominance of a functional independence status under BADL (96%, with a mean of 5.5 ± 0.1 points) and of mild dependence (41%, with a mean of 23.6 ± 0 8 points) according to IADL (Table 2).

As for the other features, 61% had chronic pain, considered mild by 5%, moderate by 33%, severe by 42%, and very severe by 20%; and 15% of participants were chronic fallers (2 or more falls in the past year). For the self-perception of health, 5% reported it as bad, 53% fair, 36% good and 6% excellent.

According to GLFS 25-P, the prevalence of LS in the sample was 63%, with mean scores of 27.6 ± 4.1 for E1, 27.3 ± 4.4 to E2, and 28.1 ± 4.2 to E3. The mean time for the application of the instrument was about 5–10 min.

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Table 1 – GLFS 25-P, a version translated and culturally adapted to Brazil.

ESCALA GERIÁTRICA DA FUNÇÃO LOCOMOTORA DE 25 ITENS (GLFS 25–P)

As perguntas a seguir serão sobre a sua condição de saúde e hábitos de vida diários, relacionados às suas costas e membros (inferiores e superiores). Por favor, responda considerando a sua condição neste último mês.

■ **Seguem abaixo perguntas sobre suas dores no corpo no último mês.**

1. Você teve dor (incluindo dormência) no seu pescoço ou membros superiores (ombros, braços ou mãos)?
☐ Sem dor ☐ Dor leve ☐ Dor moderada ☐ Dor grave ☐ Dor muito grave

2. Você teve dor nas costas, região lombar ou nádegas?
☐ Sem dor ☐ Dor leve ☐ Dor moderada ☐ Dor grave ☐ Dor muito grave

3. Você teve dor (incluindo dormência) nos seus membros inferiores (quadril, coxa, joelho, panturrilha, canela, tornozelo ou pé)?
☐ Sem dor ☐ Dor leve ☐ Dor moderada ☐ Dor grave ☐ Dor muito grave

4. Até que ponto tem sido doloroso movimentar seu corpo no dia a dia?
☐ Sem dor ☐ Dor leve ☐ Dor moderada ☐ Dor grave ☐ Dor muito grave

Seguem abaixo perguntas sobre seus hábitos de vida diários, considerando o último mês.

5. Até que ponto tem sido difícil levantar da cama ou deitar?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

6. Até que ponto tem sido difícil levantar da cadeira?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

7. Até que ponto tem sido difícil caminhar dentro de casa?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

8. Até que ponto tem sido difícil vestir e tirar uma blusa?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

9. Até que ponto tem sido difícil vestir e tirar as calças?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

10. Até que ponto tem sido difícil usar o banheiro?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

11. Até que ponto tem sido difícil lavar o seu corpo durante o banho?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

12. Até que ponto tem sido difícil subir e descer escadas?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

13. Até que ponto tem sido difícil andar rápido?
☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

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Table 1 (*Continued*)

14. Até que ponto tem sido difícil se manter arrumado (a)?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

15. Quanto você consegue andar sem descansar? (por favor, selecione a melhor resposta)

☐ Mais de 2-3km ☐ Aproximadamente 1km ☐ Aproximadamente 300m ☐ Aproximadamente 100m ☐ Aproximadamente 10m

16. Até que ponto tem sido difícil visitar seus vizinhos?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

17. Até que ponto tem sido difícil carregar objetos pesando aproximadamente 2 kg (2 caixas de leite ou 2 garrafas de 1 litro cada)?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

18. Até que ponto tem sido difícil usar o transporte público?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

19. Até que ponto tem sido difícil realizar as tarefas simples do lar (cozinhar, limpar, etc.)?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

20. Até que ponto tem sido difícil realizar as tarefas pesadas do lar (limpar o quintal, carregar roupas de camas pesadas, etc.)?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

21. Até que ponto tem sido difícil praticar atividades esportivas (caminhar rápido, nadar, jogar bola, dançar)?

☐ Sem dificuldade ☐ Pouca dificuldade ☐ Moderada dificuldade ☐ Muita dificuldade ☐ Extrema dificuldade

22. Você tem sido limitado (a) de encontrar seus amigos?

☐ Sem limitação ☐ Algumas vezes limitado (a) ☐ Limitado (a) metade das vezes ☐ Muitas vezes limitado (a) ☐ Desisti de todas as atividades

23. Você tem sido limitado (a) de frequentar atividades sociais (encontrar amigos, praticar esportes, lazer e hobbies, etc.)?

☐ Sem limitação ☐ Algumas vezes limitado (a) ☐ Limitado (a) metade das vezes ☐ Muitas vezes limitado (a) ☐ Desisti de todas as atividades

24. Você já se sentiu com medo de cair dentro de casa?

☐ Não me senti com medo ☐ Quase nunca me senti com medo) ☐ Às vezes me senti com medo ☐ Quase sempre me senti com medo ☐ Constantemente me senti com medo

25. Você já se sentiu com medo de não poder andar no futuro?

☐ Não me senti com medo ☐ Quase nunca me senti com medo) ☐ Às vezes me senti com medo ☐ Quase sempre me senti com medo ☐ Constantemente me senti com medo

In the analysis of the properties of measures of GLFS 25-P, and initially with reference to the property "reliability" according to its internal consistency, high Cronbach's alpha values were obtained: 0.942 for E1, 0.952 for E2, and 0.949 for E3. As to reproducibility, three analyses were carried out. According to the Paired Student's *t*-Test, which compared the means of GLFS 25-P in E1, E2, and E3, no statistically significant differences were found (Table 3). According to ICI, optimal results were obtained: 97.6% of inter-observer correlation (E1 and E2) and 98.4% of intra-observer correlation (E1 and E3) (Table 3). In the agreement analysis between interviewers for each item of the instrument in question, considerable values were found (between 0.248 and 0.673) for Kappa statistics (Table 4).

In the validation process, statistically significant correlations were found with the functionality indices in basic and instrumental activities, with regular indices for BADL (>45%) and good indices for IADL (>60%), according to the Pearson's coefficient. Such correlations were negative, that is, the higher the scores of GLFS 25-P, the lower the functional indices for BADL and IADL (Table 5). Significant (and positive) associations were also verified between LS and the presence of chronic pain ($p < 0.001$) and occurrence of falls ($p = 0.02$); furthermore, a significant association with self-perceived health was also determined, but in this case with a negative correlation ($p < 0.001$), according to the chi-squared test.

We also conducted a multivariate analysis, including the variables that were significantly associated with GLFS 25-P in

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Table 2 – Sample characterization.

	n	%	*p*-value
Age (years)			
Mean (CI) 82 (1.5)			
Min–Max 61–100			
60–70	9	9	<0.01
71–80	28	28	<0.01
81–90	53	53	
> 90	10	10	<0.01
Gender			
Male	27	27	<0.01
Female	73	73	
Ethnic group			
White	50	50	
Brown	39	39	0.118
Black	11	11	<0.01
Marital status			
Married	35	35	0.015
Single	8	8	<0.01
Widow(er)	52	52	
Separated/divorced	5	5	<0.01
Scholarship (years)			
Illiterate	16	16	<0.01
1–4	57	57	
5–8	11	11	<0.01
9–11	3	3	<0.01
≥12	13	13	<0.01
BADL			
Mean (CI) 5.5 (0.1)			
Min-Max 3–6			
Independent	96	96	<0.01
Partial dependency	4	4	
IADL			
Mean (CI) 23.6 (0.8)			
Min–Max 11–27			
Independent	40	40	0.885
Mildly dependent	41	41	
Moderately dependent	13	13	<0.01
Severely dependent	6	6	<0.01

CI, confidence interval; Min–Max, minimum–maximum.

Table 3 – Reproducibility of GLFS 25-P, according to Student's t-test and ICI.

GLFS-25 P	E1	E2	E1	E3
Student's t-test				
Mean	27.6	27.3	27.6	28.1
Median	25	23.5	25	27
Standard deviation	20.7	22.3	20.7	21.4
CI	4.1	4.4	4.1	4.2
p-value	0.66		0.304	
ICI	E1/E2		E1/E3	
%	97.60		98.40	
p-value	<0.001		<0.001	

CI, confidence interval.

Table 4 – Reproducibility of GLFS 25-P, according to Kappa index.

GLFS	E1/E2		E1/E3	
	Kappa	*p*-value	Kappa	*p*-value
Question 1	0.512	<0.001	0.597	<0.001
Question 2	0.364	<0.001	0.417	<0.001
Question 3	0.297	<0.001	0.46	<0.001
Question 4	0.396	<0.001	0.472	<0.001
Question 5	0.532	<0.001	0.456	<0.001
Question 6	0.572	<0.001	0.508	<0.001
Question 7	0.532	<0.001	0.591	<0.001
Question 8	0.511	<0.001	0.55	<0.001
Question 9	0.469	<0.001	0.488	<0.001
Question 10	0.642	<0.001	0.546	<0.001
Question 11	0.469	<0.001	0.531	<0.001
Question 12	0.529	<0.001	0.611	<0.001
Question 13	0.497	<0.001	0.611	<0.001
Question 14	0.55	<0.001	0.522	<0.001
Question 15	0.593	<0.001	0.56	<0.001
Question 16	0.248	<0.001	0.206	0.001
Question 17	0.533	<0.001	0.652	<0.001
Question 18	0.641	<0.001	0.555	<0.001
Question 19	0.465	<0.001	0.531	<0.001
Question 20	0.465	<0.001	0.561	<0.001
Question 21	0.575	<0.001	0.551	<0.001
Question 22	0.429	<0.001	0.673	<0.001
Question 23	0.399	<0.001	0.484	<0.001
Question 24	0.438	<0.001	0.402	<0.001
Question 25	0.501	<0.001	0.416	<0.001

the univariate model; it was noted a significantly higher risk of LS in the presence of chronic pain (OR 15.92, 95% CI 3.08–82.27) and also in the presence of a worse self-perception of health (OR 0.23, 95% CI 0.07–0.79) (Table 6).

Discussion

GLFS-25 was created in Japan in 2011 and, until then, had not yet been translated, culturally adapted or validated in other populations, despite the importance of the topic discussed.

In this study, the Brazilian version of GLFS-25 (GLFS 25-P) used known and frequently used terms in our midst, and thus was easily understood by older people from different age groups and levels of education.

The instrument in question allows an important multidimensional analysis of the aging individual, by being composed

Table 5 – Correlations between GLFS 25-P and functional status, according to Pearson's coefficient.

	BADL	IADL
E1		
Corr. (*r*)	−50.30%	−62.30%
p-value	<0.001	<0.001
E2		
Corr. (*r*)	−45.90%	−61.30%
p-value	<0.001	<0.001
E3		
Corr. (*r*)	−49.50%	−63.90%
p-value	<0.001	<0.001

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Table 6 – Logistic regression of studied variables.

Variable	Coefficient	*p*-value	Odds Ratio
Constant	0.0468		
Chronic pain	2.7673	0.001	15.92
Fall	0.5437	0.526	1.72
Self-perception of health	−1.4506	0.019	0.23

of questions related to health and mobility and grouped in areas, namely: daily care (5 questions), difficulties related to the motion (3 questions), pain (4 questions), cognition (2 questions), and items associated with social activities (4 questions). This instrument presents also a sixth domain (7 items), with questions related to functionality in daily life, which has proved to be strongly associated with the other areas. Thus, this is considered a key domain, or a critical dimension, of the instrument.[3]

Our sample is composed primarily of women (80.4%), in line with data from the scientific literature that point to a feminization of the aging process.[11] Furthermore, this series counted on "very old" elderly subjects (63% of the participants were aged 80 years or older). Therefore, our sample duly represented that part of the population with the fastest growth rate in the world: the long-lived individuals.[12,13]

By analyzing the psychometric properties of GLFS 25-P, and initially considering its internal consistency, we could observe a high value for Cronbach's alpha in all interviews (above 0.9), similar to the value obtained in the validation of the original study instrument (0.961).[3]

As to the reproducibility of GLFS 25-P, the instrument was considered outstanding, taking into account the intra- and inter-observer correlations and the fact that no significant differences were observed in the analyses. In addition, for each question of the instrument, the agreements obtained from the interviewers were considerable, according to Kappa statistics. Thus, the overall reliability of was satisfactory, in view of all reproducibility analyses of the instrument.

By analyzing each question of the instrument, we noted that some questions are similar, due to the fact that they address a specific topic, such as social interaction in questions 16, 22 and 23, showing a certain redundancy. However, other issues, such as self-perceived health and risk of falling, which were associated with LS in this study, were not directly addressed. In the instrument validation process under discussion, GLFS 25-P was correlated with functionality indices, both for basic activities and for instrumental activities of daily living, which is common in studies with elderly populations. To date, there is no availability of a gold standard for the diagnosis of LS; however, significant associations were observed between this syndrome and loss of function in the elderly.[2]

As demonstrated in a previous study, an association with the occurrence of falls was observed, which emphasizes the need for an LS screening procedure, in order to prevent osteoporotic fractures.[14] Similarly, chronic pain of musculoskeletal etiology, as that affecting the knee, spine, or shoulders, has also been associated with LS, which would strengthen the need for an early treatment in the prevention of this syndrome in the elderly.[15] As for the self-perception of health, ours was the first study to analyze the correlation of this topic with LS. The significant association of LS with a worse self-perceived health, as verified in the present study, shows a possible negative impact of LS in the individual's quality of life.

The prevalence of LS among elderly subjects in this study was 63%, representing a high proportion of elderly at risk of locomotive dysfunction. Screening programs for LS in the elderly could assist in implementing early interventions aimed at preventing these disorders. To that end, the availability of an easy-to-understand, easy-to-apply instrument would help those professionals in services of great demand.

With reference to the limitations of this study, we mention the fact that we did not perform physical tests that could also assess the risk of LS, for instance, the "Stand-up test" and the "Two-step test", as has been suggested by some authors.[16] However, only very recently these same tests were appointed as new indices in the assessment of risk for LS; that is, they were identified as indices of risk and declining mobility, in the same way as GFLS-25.[14,17]

GLFS 25-P was considered a simple and quickly applicable tool, requiring a short time period (about 5–10 min) for its application. In this study, we did not make the self-application of the instrument, as the different levels of education of the elderly in our midst would be an important secondary bias. However, this could be a very interesting way of application, for example, in physician's "waiting rooms" and in offices of other health professionals, which would facilitate the assessment of risk for locomotive disorders in the elderly. In this latter sense, these case studies would be of great value in our environment, especially if longitudinally conducted, since they could assist in establishing causal relationships for LS. And in these cases, the studies also would help to assess the impact of preventive approaches, such as monitored physical activity programs, in the prevention of locomotive disorders, and in the institutionalization of the elderly.

In conclusion, GLFS 25-P constitutes a tool with appropriate translation and cultural adaptation, and through the analysis of its psychometric properties, it was found that this instrument has proven reliable and valid for the screening of LS in elderly individuals living in our midst.

Conflicts of interest

The authors declare no conflicts of interest.

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